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be included under cecidology, is that part of the work of EAST and HAYES[17] on inheritance in maize which refers to "plant abnormalities." In this part of the work, the authors state their objects as follows: "The first object was to see whether the manner of transmission of inheritable monstrous characters gives any clue to the reason why monstrosities have seldom obtained a foothold in nature when in competition with normal types. The second object was commercial. If teratological specimens appear in commercial varieties of maize, it is desirable to know the easiest method to destroy them." The authors discuss the appearance of and experiments with dwarf forms, irregularity of rows of seeds on cob, bifurcated ears, ears with lateral branches, plants with striped leaves, and hermaphrodite flowers. They call attention to the fact that many of these monstrous variations occur in strains that have been self fertilized for several generations, and suggest that inbreeding may give the same effect as lack of nutrients, while cross-breeding may give the opposite effect. Monstrosities are due to retardation or acceleration of cell divisions. The question is then raised as to whether the monstrosities might not be due to an abnormal distribution of the chromatin. Another paper is promised on the effects of inbreeding in maize.—MEL. T. COOK.

Recent papers on Phytomyxaceae.—MAIRE and TISON[18] have published a brief note on *Tetramyxa parasitica* Goebel, which produces galls on *Ruppia* and *Zannichellia.* The parasite appears in the host cell in the form of an amoeba, which undergoes division simultaneously with the host cell in such a way that at first only a single amoeba appears in each cell. During this stage the nuclei are said to divide in the manner described by NAWASCHIN and by PROWAZEK for *Plasmodiophora.* As these accounts differ somewhat as to detail, it may be inferred that the division in its main features follows the method common to the members of this group, by the formation of a chromatic ring around a karyosome, both of which divide. This stage is followed by the chromidial stage, during which the chromatin disappears from the nuclei and chromatic bodies appear in the protoplasm. Later the (same) nuclei appear with a chromatin network and undergo two karyokinetic divisions, which are followed by spore formation. Karyogamy was not observed.

In a second paper, MAIRE and TISON[19] describe a new genus, *Ligniera,* to include those species of the Plasmodiophoraceae which lack the schizogenous stage or have it very poorly developed, and which do not cause gall formation in the host plant. By these characteristics the genus is separated from the genera

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[17] EAST, E. M., and HAYES, H. K., Inheritance in maize. Conn. Agric. Exp. Station, Bull. 167. pp. 129–137. 1911.

[18] MAIRE, RENÉ, et TISON, ADRIEN, Sur quelques Plasmodiophoracées. Compt. Rend. **150**: 1768–1770. 1910.

[19] ———, Sur quelques Plasmodiophoracées non hypertrophiantes. Compt. Rend. **152**: 206–208. 1911.

Plasmodiophora, *Sorosphaera*, and *Tetramyxa*. The new genus includes *L. radicalis*, which is new, *L. Junci* (Schwartz) (*Sorosphaera Junci* Schwartz), and *L. verrucosa*, also new.

OSBORN[20] gives an account of the development of the interesting form *Spongospora subterranea*, causing the corky scab of potatoes. Penetration of the organism into the host cell was not observed, nor was it possible to infect sound potatoes with spores. The first stage observed consisted of an amoeba containing a single nucleus, which had a membrane, chromatic granules, and a deeply staining karyosome. In the early stages nuclear division is followed by division of the amoeba, so that a number of independent amoebae are found in the same host cell. The parasites occur in the cambium, and when the parent cell divides, one or more amoebae are included in each daughter cell, in the manner described by NAWASCHIN for *Plasmodiophora*, and by BLOOMFIELD and SCHWARTZ for *Sorosphaera*. The division of the nuclei during this stage is of the type characteristic of the group. The chromatin forms a ring around the karyosome; both the ring and the karyosome then divide, and the halves move toward the poles, where the halves of ring and karyosome unite into a deeply staining mass. The nuclear membrane constricts between the masses, and finally divides at the point of constriction, leaving each chromatic mass enclosed in a separate membrane. No fibers or polar radiations were observed. At a later stage many of the amoebae are multinucleate, and when the food content of the host cell is exhausted, the amoebae coalesce to form a plasmodium. At this time the chromatin of the nuclei disappears and chromatic material appears in the protoplasm. When the nuclei appear organized again, they contain a chromatin network but no karyosome. The author is inclined to believe that the new nuclei are constructed *de novo*. This stage is soon followed by fusion of nuclei in pairs, and a period of nuclear growth previous to spore formation. Two karyokinetic divisions take place, after which the protoplasm is rounded up into uninucleate spores.

In a later paper MAIRE and TISON[21] give the results of further observations on *Sorosphaera*, *Tetramyxa*, *Ligniera*, and *Mollierdia*, some of which differ in some points of their development from other forms of this group. *Tetramyxa parasitica* has multinucleate plasmodia during the phase representing the schizogenous stage, the nuclear divisions not being accompanied by cell division. The chromidial stage, prominent in other forms, is lacking here. At the beginning of spore formation, the plasmodia break up into uninucleate masses. These masses become four-nucleate as a result of two mitotic divisions, and divide by constriction into four uninucleate spores. In this form, as well as in *Sorosphaera*, amoebae are carried into new cells by the division of the infected host cell as described above for *Spongospora*.

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[20] OSBORN, T. G. B., *Spongospora subterranea* (Wallroth) Johnson. Ann. Botany **25**:327–341. *pl. 27.* 1911.

[21] MAIRE, RENÉ, et TISON, ADRIEN, Nouvelles recherches sur les plasmodiophoracées. Ann. Myc. **9**:226–246. *pls. 10–14. fig. 1.* 1911.

Ligniera radicalis develops in the root hairs and cortical parenchyma of the roots of *Callitriche stagnalis*. As stated in the former paper, a true schizogenous phase is lacking. As in *Tetramyxa*, cell division does not accompany nuclear division during the growth of the organism. The chromidial stage occurs here as usual before the meiotic divisions. The first of these divisions often occurs before the plasmodium has broken up, but in such cases the plasmodium breaks up into "energids" during the second mitosis in such a way that the four nuclei resulting from the two mitoses are inclosed in the protoplasmic masses, which break up into four spores. The mode of development of *L. Junci* and *L. verrucosa* is similar to that of *L. radicalis*.

Molliardia is described as a new genus to include *Tetramyxa Triglochinis* Molliard. This form is peculiar in producing no spores on the host plant. The infected cells contain plasmodia which soon break up into uninucleate schizonts. These become 2–8-nucleate and break up anew. The full life history of this form is not known. In conclusion, the author adds some observations on the affinities of the Plasmodiophoraceae. He is inclined to regard them as being more closely related to such forms as *Rhizomyxa* and *Woronina* among the Chytridiales than to the Myxomycetes.—H. HASSELBRING.

The Grigna mountains.—The Grigna group of mountains includes some 60 square miles of mountainous country in northern Italy, adjoining the eastern shores of Lake Como and the connecting Lake Lecco. Its phytogeographical description by GEILINGERE[22] has an additional American interest because of the location of the region near the main route of American tourist travel. Notwithstanding its small area, the elevation varies from 199 meters at Lake Como to 2,410 meters on the highest of the peaks. This permits a wide range in climate, which is of course reflected in the vegetation. The Mediterranean province does not reach so far north, but many species of Mediterranean origin are present, and the olive extends to a maximum altitude of 490 meters. Most of the area is comprised within the submontane region, with forests of oak, hop hornbeam, and chestnut extending up to 1050 meters. From this elevation to 1650 meters the montane beech forests dominate. These in turn are succeeded by the subalpine forests of larch as far as 1950 meters, above which is the treeless alpine region. For all of these regions the author distinguishes ecological groups with a detail seldom approached in America. He recognizes seven chief types of vegetation, including forest, bush-forest, perennial herbs, grassland, swamps, aquatic vegetation, and rock vegetation. These are subdivided into formational groups, formations, and societies, of successively minor importance. This classification is based

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[22] GEILINGERE, G., Die Grignagruppe am Comersee. Bot. Centralbl. **24**^{2}: 119–420. 1909.